UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
CHEMICAL SAFETY AND
POLLUTION PREVENTION

MEMORANDUM:

From: Kevin Sweeney, Senior Entomologist, Insecticides Branch

Date: January 14, 2014

Subject: PRODUCT PERFORMANCE DATA EVALUATION RECORD

This task was not reviewed by the EPA contractor. This DER is the primary review.

DP barcode: 412307
Decision no.: 477659
Submission no: 933627
Action code: R310
Product Name: ESD 12101
EPA Reg. No or File Symbol: 1021-EARI
Formulation Type: Ready to Use Spatial repellent
Ingredients statement from the label with PC codes included: 4.0% metofluthrin (pc code: 109709
Application rate(s) of product: RTU spatial repellent
OPPTS Guideline: none. 810.3700 and 810.3300 provide some guidance.

Non-human studies were used to assess efficacy.

I. Action Requested: Review submitted studies to evaluate the efficacy of the product as a spatial repellent against adult mosquitoes.

II. Background: This product is proposed as a residential spatial repellent for outdoor use against mosquitoes. The registrant and the registrant's contractor worked through the agency to gain study protocol approval. These studies used outdoor enclosures and baited traps. The number of adult mosquitoes released into the enclosure was known as were the age, blood feeding status, and sex. Mosquitoes collected in traps were identified to species, sex, and counted.

III. MRID Summary:
Good Laboratory Practices: These studies were not conducted in accordance with Good Laboratory practices as described in 40 CFR Part 160. The protocol used was previously

approved by the EPA.

MRID 49102111 J. Zhai. 2013. Semi-field evaluation of the repellent efficacy of ESD12101 against *Aedes aegypti* mosquitoes in Thailand. Eurofins Agroscience Services Inc. Thailand, Takhli, Nakhon Sawan, Thailand 47 pp.

Purpose: To determine the repellent efficacy of a metofluthrin based spatial repellent product against adult *Aedes aegypti* mosquitoes using a walk-in screened tunnel/enclosure.

Materials and Methods:

Test location: Eurofins Agroscience Services Inc. Thailand, Takhli, Nakhon Sawan, Thailand

Study Director: Jing Zhai

Test material(s): A liquid vapor device was used that contained 4% metofluthrin (w/w).

Test species name, life stage, sex and age: Adult *Aedes aegypti* mosquitoes that were 3-7 days old. Population contained a mix of males and females. Mosquitoes were not blood-fed. Sugar was withdrawn by two hours before testing. 2000 adult mosquitoes were released per replicate (page 11 of 47). Note that the report also states that mosquitoes were not sugar fed after 12:00 pm.

Treatments: Two treatments. One was an untreated control with no vapor exposure. The second treatment was a product treatment exposed to a 4% metofluthrin vapor.

Number of replicates per treatment: Six. The experiment was conducted on three nights. Each night had two untreated and two treated group in separate enclosures. No enclosure was used two nights in a row. Data from treatments and controls were pooled.

Number of individuals per replicate: A total of 2000 male and female mosquitoes. Sex ratio was 1:1.

Experimental conditions: Over three nights the temperature ranged from 23 to 35 degrees Celsius. The RH was 40-95%.

Describe test containers, chambers and/or apparatus (include site description and location) and how the experiment was conducted:

Eight large screened closures were established. Each contained natural vegetation. The framed enclosures had the following dimensions: 11.5 feet high, 18 feet long, and 48 feet wide. From the photographs provided they appear to be 48 feet long and 18 feet wide. The framed enclosure was covered with shade cloth that was

90% black. Each screened enclosure, which was referred to in the study as a tunnel, was separated by at least 15 feet.

Length of exposure to treatment (time in seconds, minutes or hours): 4 hours

Test substance application: The LV device was placed six feet from each carbon dioxide baited trap and was turned on one hour before mosquitoes were released. A different device was used for each replicate. Metofluthrin devices were aged before application with 45-55 cycles run before testing. An average of 1.24 ml was applied per 10 hours of the test.

Trapping mosquitoes: Mosquitoes were trapped with carbon dioxide baited BG Sentinel traps placed six feet from the LV device. Two were used per replicate. Traps were run for four hours after mosquito release. All captured mosquitoes were counted. The protected area was less than the proposed label claim.

Were tested specimens transferred to clean containers? If so, when? N/A

Data or endpoints that were to be collected/recorded: Number of mosquitoes collected in each treatment were compared and % repellency calculated.

Were the data analyzed? If so, what statistical analyses were performed?

An Analysis of Variance was conducted.

Results: The product was > 90% effective against Aedes aegypti

Conclusion: The study is acceptable.

MRID49102113 J. Zhai. 2013. Semi-field evaluation of the repellent efficacy of ESD12101 against *Anopheles sp.* mosquitoes. Eurofins Agroscience Services Inc. Thailand, Takhli, Nakhon Sawan, Thailand 48 pp.

Conclusion: The study is acceptable.

MRID49102112 J. Zhai. 2013. Semi-field evaluation of the repellent efficacy of ESD12101 against *Culex quinquefasciatus* mosquitoes in Thailand. Eurofins Agroscience Services Inc. Thailand, Takhli, Nakhon Sawan, Thailand 48 pp.

Conclusion: The study is acceptable.

The protocol for *Culex quinquefasciatus* and *Anopheles dirus* was exactly the same as described above for *Ae. aegypti.*

Results for these species also exceeded 90%effectiveness.

IV. EPA Entomologist Recommendations:

1. The studies are acceptable and support the addition of the pest "mosquitoes to the label. Note that the distance from the trap changed from the original protocol from seven to six feet.

- Change area of protection to 100 square feet from 155 feet.
- Change "Protects a 12 to 14 feet diameter [of repellency] to "10 feet x 10 feet area"
- Change the area protected by six fixtures to 600 square feet

2. Revise the label as follows:

a. Remove reference to specific species on the label. Replace with "mosquitoes".

b. Remove the following claims:

- Odorless.
- Repellent you don't apply to [spray on] clothes or skin
- Spray-less [spray-free] [biting] mosquito repellent [protection]
- Remove repellent is odorless [silent] [and invisible]
- Effective season long mosquito protection for your entire deck, porch or patio
- Attractive light fixtures that protect your outdoor patio, [unenclosed porch], [walkway], [or deck] area from [biting] mosquitoes all season
- Remove all references to invisible
- Remove "season long" from the label.
- It's as easy as turning on the lights to say goodbye to [biting mosquitoes] mosquitoes and the old hassles of keeping them away the entire summer
- Buy one get one free
- Coupon ($) rebate inside